International, Space, and Response Technologies Division
Space and Atmospheric Sciences (ISR-1)
P.O. Box 1663 – MS D466
Los Alamos, New Mexico 87545
(505) 667-1210/Fax (505) 665-7395

August 25, 2004
ISR-1-04-100

Dr. Andrew Christensen
Northrop Grumman Space Technology
One Space Park, R9-1914
Redondo Beach, CA 90278

Dear Andy,

The Sun-Earth Connections Subcommittee met in San Diego on July 26-28. Because of my unanticipated absence, SECAS member Jim Clemmons (chair of the Geospace MOWG) served as acting chair. With invaluable assistance from Barbara Giles, Jim did a great job leading the meeting. A copy of the agenda is attached to this letter.

One of the important activities of the meeting involved the review, revision, and acceptance of the SEC summary of accomplishments for this year's GPRA review. The committee was very pleased with the breadth and depth of these accomplishments, and we congratulate NASA headquarters and the science community on an exciting, productive year.

Another important activity was a discussion of this year's roadmapping process and the consideration of guidance the committee will give the SEC roadmap committee. We are pleased that Todd Hoeksema will chair the roadmap committee, with co-chair Tom Moore.

The committee heard an update on the Explorer program status and would like to express its appreciation for the way in which the Explorer program has responded to its resource shortfall issues. SEC relies heavily on this program for achievement of strategic goals in a timely manner, so the ability of the Explorer program personnel to minimize the amount of disruption to the program is especially valuable. The committee offers it gratitude to those instrumental in this effort, especially Dr. Paul Hertz and Mr. Chuck Gay.

A highlight of our meeting was a joint lunch session with SSES, during which we addressed a number of topics of mutual interest. Recognition of the overlapping interests of our two communities gave rise to one of our findings, namely that we jointly explore research and mission opportunities that promote synergistic planetary and space research investigations. Another outcome of the discussions was an agreement to exchange representatives on our respective roadmap committees. I am hopeful that such joint sessions can become a regular feature of future committee meetings.

In our continuing effort to explore the interrelationship of SEC science and the Exploration Vision, part of our discussion focused on the importance of understanding at a predictive level the space environment to which human space travelers must be exposed. One of our findings is thus a recommendation that such a predictive capability be recognized as a high-order requirement of the Exploration program.

Our full set of findings is attached.

One final note: Our committee wishes to express our gratitude to Ed Weiler for his unstinting and effective service to our nation in the cause of scientific discovery and understanding. His dedication to the fundamental importance of the highest-quality science as the foundation and motivation of a successful space research program are deeply appreciated, and we wish him well in the new challenges he faces at Goddard Space Flight Center. We also extend our welcome to Al Diaz and our best wishes for a strong and productive partnership in the execution of NASA's exciting science program.

Best regards,

Michelle F. Thomsen
SECAS chair

cc Dr. Richard Fisher

attachments

SECAS Findings from 26-28 July 2004 Meeting
Agenda for 26-28 July 2004 SECAS Meeting

Summary of SECAS Findings, 26-28 July 2004

1. *Need for an agency-level requirement to characterize and understand the space environment*

Issue: An agency level requirement is needed to characterize and understand the dynamic space environment in which robotic and human missions will be immersed. This dynamic space environment is often a significant source of variability in planetary environments.

Background: The Exploration Vision has elevated the significance of the science of Solar System Connections. Understanding and being able to predict the environment of space and its interaction with planetary bodies is needed for deep space travel of robotic and human missions. There are unique areas of expertise regarding space weather and therefore unique contributions that only this community can make to the exploration effort.

Recommendation: We recommend that an agency Level-0 requirement be established for an end-to-end predictive capability for solar system environmental conditions based on observations, theory, and modeling.

2. *Sounding rocket program*

Issue: The projected sounding rocket program budget through FY09 requires a major scaling back of the program. The Sounding Rocket Program Office (SRPO) has submitted a proposal for this reduction, which does not meet the needs of SEC.

Background: The projected budget for the sounding rocket program is flat through FY09, falling 35% below the previously expected budget. This eliminates new projects: the advanced pointing system and high performance rocket development. It greatly reduces acquisition of replacement rocket motors. There will be insufficient money to support some present launch sites. To meet the shortfall, the SRPO has proposed to stop using White Sands and mobile launch sites, to develop water-recovery capability at Wallops Island, and to reduce high performance launches so that the mix of launches is predominantly surplus, low performance rockets with 75% fewer Black Brant class vehicle launches. The majority of SEC launches use Black Brant class vehicles, many of which are launched at White Sands and difficult to adapt to saltwater wet recovery.

Recommendation: Due to serious resource difficulties in the LCAS (Low-Cost Access to Space) Program, SECAS endorses the SEC plan to conduct a zero-based review of the program. In particular, SECAS reaffirms the importance of the SEC launch vehicle and launch rate needs. Any plan must ensure dry recovery for recoverable payloads.

3. *Coordination of planetary and solar system connections investigations*

Issue: There is no programmatic emphasis or explicit opportunity for collaboration between the planetary and the solar system connections communities.

Background: Understanding the connections within the solar system between solar variability, interplanetary space, and planets is necessary to meet exploration goals. Currently there are separate traditional opportunities to investigate planetary bodies or the connection between the variability of the sun and the magnetized plasma environment around planet Earth. There is a lack of opportunity and emphasis to meld space physics and planetary science in a mission to investigate the interrelationship between planets and the solar driven environment of space in which they are embedded.

Recommendation: We recommend that the divisions of Planetary and Solar System Connections jointly explore methods through research and mission opportunities that promote synergistic planetary and space research investigations.

4. *Scope of theory effort*

Issue: A fundamental theoretical understanding of the information gathered through NASA missions is a prime goal of the space science enterprise. The SSP Decadal Survey Report recommends that the scope of the theory effort be broadened and strengthened to better engage space science activities. Their recommendations provide opportunities for inter- and intra-agency support, and collaborative efforts engaging solar systems connections, Earth and Planetary Science.

Background: SR&T, mission theory programs, some elements of GI programs, and notably the SECTP "Theory Program" provide support for theoretical study, at various degrees of association with space datasets. The Theory Program in particular originated with the goals of supporting and maintaining "critical mass" efforts in challenging space physics problems, with funding stable enough, in the original implementations of the program, to evolve new career level positions in the science community. Currently, there is need for an augmentation of theory and modeling support for large cross-cutting efforts, the study of complex systems, nonlinear and/or cross scale couplings, non-deterministic systems and the development of end-to-end predictive capabilities that will be required for future human and robotic exploration. These topics were embraced by the SSP Survey, which recommended a program called the “Coupling Complexity Initiative”.

Recommendation: SECAS recommends that activities be initiated to design and implement a cross-cutting, inter- and intra agency theory and modeling program along the lines of the Survey's Coupling Complexity Initiative to support the evolving science direction of solar system connections.

5. *EPO at post-secondary levels*

Issue: A vital and vibrant workforce comprised of young scientists and engineers is necessary for the future of the Solar System Connections community.

Background: The current emphasis of NASA's EPO program is on grades K-14. There is an apparent lack of EPO emphasis on advanced placement programs and the graduate and undergraduate levels that could serve as a mechanism to attract students to space science at the time in their lives they are making career decisions. In addition, there is no emphasis for EPO proposals to target these students.

Recommendation: The SECAS believes it would be a wise and profitable investment for the agency to use the NASA EPO program to impact more advanced levels of education to attract students to space science. In order to better understand this issue, we request that a presentation be made at the next SECAS meeting that explains the current efforts and future plans of the NASA EPO program to specifically impact advanced placement programs and graduate and undergraduate students.

6. *System science emphasis for senior review*

Issue: Guidance has been requested for developing criteria in the senior review for evaluating operating missions based on their value as elements in a distributed integrated sun-heliosphere-planetary system observatory.

Background: The Sun-Earth and heliospheric interaction form a complex dynamical system in which close couplings and feedbacks can change the zeroth-order response to solar eruptions [*NASA SEC Roadmap* 2002; *The Sun to Earth—and Beyond: A Decadal Research Strategy in Solar and Space Physics, NAS*, 2003]. This complexity poses formidable challenges to scientific understanding and to the range of useful prediction. Systems issues are at the cutting edge of space science and are the basis for the complexity initiative called out in the NRC Decadal survey. System science is also at the core of the "Living with a Star" program and is crucial for the understanding of the space environment that is needed for the Exploration Initiative. The immediate need is to provide a nationally focused capability to investigate the sun-earth interaction as a complex natural system. The best means to attack this problem is by synthesizing observations from the current fleet of operating satellites into a distributed sun-heliosphere-planetary system observatory. The senior review of operating missions is a strategic vehicle for crystallizing collaborations between operating missions to focus and enhance a process which is already underway as a result of grass roots efforts in the community.

Recommendation: SECAS recommends that statements in the call for proposals for extended missions solicit the best mission science in each case but, in addition, multi-mission studies that clarify coupling and feedbacks underlying the solar, geospace, heliospheric system responses.

7. *Draft AO for LWS*

Issue: The community of potential respondents to the impending LWS AO would benefit from the early release of information likely to be present in the released AO. Such information would allow teams to form and begin advance work, a process that is likely to result in higher-quality proposals.

Background: The community has indicated that past experience with draft AOs has been positive. They appreciate not only the ability to comment before the full AO is released, but also benefit from having information on likely release date, proposal due date, mission timeline, cost caps, and mission scenario (PI, instrument suite, individual instrument).

Recommendation: The committee urges the LWS program to find a way to release information likely to be present in the finished AO. A draft AO would satisfy this request, as would a less formal notice of intent.

AGENDA - SECAS – JULY 26-28, 2004
Shelter Pointe Hotel and Marina, 1551 Island Drive
SHELTER ISLAND, SAN DIEGO, CALIFORNIA 92106
(800) 566-2524

MONDAY, 26 JULY 2004

0815	Meeting Room Open, Coffee	
0830	Welcome	Michelle Thomsen
0840	E/PO for SEC Roadmap	Phil Sakimoto
0910	SEC Roadmap – 2006 Science Strategic Plan Schedule / OSS Guidelines Creation of charge to roadmap committee	 Barbara Giles Committee
1015	Break	
1030	SEC Roadmap (continued)	Committee

1200	Group Lunch Meeting with presentation: Chris St Cyr of NASA/GSFC on "Space Weather's Impact on Wholesale Electricity Prices" *[Forbes and St Cyr, in press, The Space Weather Journal]*

1300	All Subcommittee Plenary	
1330	MOWG reports (15 min each) Geospace Solar-Heliospheric LWS	 Jim Clemmons Steve Suess Jim Spann for Dan Baker
1415	Break	
1430	SEC Division Report, including Missions Update	Dick Fisher
1530	GPRA Discussion and Writing	Giles/Committee
1700	Adjourn	
1830	Group Dinner	

TUESDAY, 27 JULY 2004

0815	Meeting Room Open, Coffee	
0830	Senior Review of Operating Missions Criteria	Chuck Holmes
0900	Living with a Star issues	Dick Fisher
0930	National Academy CSSP ad hoc Committee Report	Fran Bagenal
1015	Break	
10:30	AA Presentation to joint session of SECAS/SSES	Ed Weiler

1200	Joint lunch meeting with SSES: Outer planets missions, Comparative Aeronomy, etc.

1300	Rocket Program Status, joint session with SSES	Dick Fisher
1330	National Priorities in SEC Theory	Gary Zank
1400	Explorer Program Status	Paul Hertz
1445	Break	
1500	DSN Status and DSN Roadmapping Plans	Preston/Deutsch
1530	Lifecycle of Mission Data	Chuck Holmes
1600	Discussion and Writing Assignments	Committee
1730	Adjourn	
1900	Padres vs Giants at PETCO Park - known SECAS attendees: Fisher, Thomsen, Matthaeus, Suess, Schwadron, Clemmons, Rabin, Spann, St. Cyr, Klimchuk, Gay, Moore and Giles	

WEDNESDAY, 28 JULY 2004

0815	Meeting Room Open, Coffee	
0830	Committee Writing Time	Committee
0915	Review of Findings	Committee
1030	Break	
1045	Review Findings with Dick Fisher	Committee/Dick Fisher
1145	Committee roundtable	Committee
1200	Adjourn	

END OF MEETING